

SIGNALIZED INTERSECTION SAFETY STRATEGIES



Improve Geometry of Pedestrian and Bicycle Facilities

WHERE TO USE

Signalized intersections with high frequencies of pedestrian and/or bicycle crashes and on routes serving schools or other generators of pedestrian and bicycle traffic.



Photos by: City of Tucson, TTI

DETAILS

The mix of travel modes at intersections, along with the vehicle-vehicle conflicts possible, can create safety and operational concerns for non-motorists.

Geometric or physical improvements that can be made to an intersection to increase pedestrian safety include the provision of the following:

- continuous sidewalks,
- signed and marked crosswalks,
- sidewalk set-backs,
- median refuge areas,
- pedestrian overpasses,
- intersection lighting,
- physical barriers to restrict pedestrian crossing maneuvers at higher-risk locations,
- relocation of transit stops from the near side to the far side of the intersection, and
- other traffic calming applications to reduce vehicle speeds or traffic volumes on intersection approaches.

Some of the problems facing bicyclists at intersections include high-traffic volumes and speeds and the lack of space for bikes. Possible improvement projects include the following:

- widening outside through lanes (or adding bike lanes),
- providing median refuge areas,
- providing independent crossing structures,
- upgrading storm drain grates with bicycle-safe designs, and
- implementing lighting.



KEY TO SUCCESS

A key to successful pedestrian and bicycle facilities is careful planning. The network of facilities should be well connected to meet the needs of the community.

Landscaped medians should not obstruct visibility between pedestrians and bicyclists and approaching motorists or include objects representing a collision hazard to vehicles that may run onto the median.

ISSUES

Agencies must overcome decades of street and road construction projects that may have routinely ignored the needs of pedestrians and bicyclists. Pro-pedestrian and bicyclist policies and construction programs need to be implemented to correct this problem. Refuge islands may conflict with the need to provide open pavement for right-turning traffic with large turning paths. A right-turn slip lane can accommodate vehicles with large turning paths but should discourage high-speed vehicle turns and improve the right-turning motorist's view of other users.

TIME FRAME ●○○○

Many treatments addressing pedestrian and bicyclist improvements can be implemented in relatively short time frames.

COSTS ●○○○

Costs will vary depending on the treatment implemented. Many are low cost in nature. Others, such as overpasses and lane widening, will cost significantly more.

EFFECTIVENESS

TRIED/PROVEN: The presence of sidewalks on both sides of the street has proven to significantly reduce the "walking along roadway" pedestrian crash risk compared to locations where no sidewalks/walkways exist. Reductions of 50 to 90% of these types of pedestrian crashes have occurred. The Federal Highway Administration found that a raised median (or raised crossing island) was associated with a significantly lower pedestrian crash rate at multilane crossing locations, with both marked (46% reduction) and unmarked (39% reduction) crosswalks. In contrast, painted (not raised) medians and center two-way left-turn lanes did not offer significant safety benefits to pedestrians on multilane roads, compared to no median at all. A Danish study concluded that providing bicycle lanes can reduce bicycle crashes by 36%.

COMPATIBILITY

These strategies are generally compatible with other signalized intersection safety strategies.

SUPPLEMENTAL INFORMATION

Improvements to pedestrian facilities are discussed in detail in *NCHRP Report 500: Volume 10*. More details on design of sidewalks and walkways, including curb ramps, may be found in the FHWA report *Designing Sidewalks and Trails for Access, parts 1 and 2*. (safety.fhwa.dot.gov)

For more details on this and other countermeasures: <http://safety.transportation.org>

For more information contact:

FHWA Office of Safety Design
E71, 1200 New Jersey Avenue SE
Washington, D.C. 20590
(202) 366-9064
<http://safety.fhwa.dot.gov>

FHWA Resource Center - Safety and Design Team
19900 Governor's Drive, Suite 301
Olympia Fields, IL 60461
(708) 283-3545
<http://www.fhwa.dot.gov/resourcecenter>



U.S. Department of Transportation
Federal Highway Administration



Safe Roads for a Safer Future
Investment in roadway safety saves lives